

CLAIMS

What is claimed is:

1. An image data processing apparatus comprising:
a dividing unit that divides image data into a plurality of blocks;
a characteristic amount extracting unit that extracts a characteristic amount from each of the blocks; and
an encoding unit that embeds a plurality of codes based on a magnitude relation of the characteristic amounts between each pair of blocks in proximity to each other in the plurality of blocks.
2. The image data processing apparatus according to claim 1, wherein the encoding unit changes at least one of the characteristic amounts of the pair of blocks so as to reverse the magnitude relation of the characteristic amounts between the pair of blocks when the magnitude relation does not coincide with a code to be embedded.
3. The image data processing apparatus according to claim 2, wherein the encoding unit does not change the characteristic amount when a difference between characteristic amounts of the pair of blocks exceeds a predetermined upper threshold.
4. The image data processing apparatus according to claim 1, wherein the encoding unit changes at least one of the characteristic amounts of the pair of blocks so as to arrange a difference between characteristic amounts of the pair of blocks to be equal to or larger than a predetermined lower threshold when the magnitude relation coincides with a code to be embedded and also when the difference is less than a lower threshold.
5. An image data processing apparatus comprising:
a dividing unit that divides image data into a plurality of blocks;
an error-correction-coding code generating unit that encodes a code using an error correction coding to generate an error-correction-coding code;
a characteristic amount extracting unit that extracts a characteristic amount from each of the blocks; and
an encoding unit that embeds a plurality of error-correction-coding codes based on a magnitude relation of the characteristic amounts between each pair of blocks in proximity

to each other in the plurality of blocks.

6. The image data processing apparatus according to claim 1, wherein the characteristic amount extracting unit extracts each characteristic amount from a portion of each block.

7. The image data processing apparatus according to claim 1, further comprising:
a cut-out unit that cuts out a yellow component from the blocks; and wherein the encoding unit embeds a plurality of codes based on a magnitude relation of the characteristic amounts with regard to the yellow color components between each pair of blocks in the blocks.

8. The image data processing apparatus according to claim 1, wherein the encoding unit gives a cut-out mark for cutting-out an image area in which the codes are embedded.

9. The image data processing apparatus according to claim 1, wherein the characteristic amount is an average density.

10. The image data processing apparatus according to claim 1, wherein the characteristic amount is granularity, chroma, density barycenter, or variance.

11. The image data processing apparatus according to claim 1, wherein the encoding unit repeatedly embeds a plurality of codes.

12. An image data decoding apparatus comprising:
a dividing unit that divides image data into a plurality of blocks;
a characteristic amount extracting unit that extracts a characteristic amount from each of the blocks; and
a decoding unit that decodes a plurality of codes based on a magnitude relation of the characteristic amounts between each pair of blocks in proximity to each other in the plurality of blocks.

13. An image data processing method comprising:
dividing image data into a plurality of blocks;

extracting a characteristic amount from each of the blocks; and
embedding a plurality of codes based on a magnitude relation of the
characteristic amounts between each pair of blocks in proximity to each other in the plurality of
blocks.

14. The image data processing method according to claim 13, further comprising:
changing at least one of the characteristic amounts of the pair of blocks so as to
reverse the magnitude relation of the characteristic amounts between the pair of blocks when
the magnitude relation does not coincide with a code to be embedded.

15. The image data processing method according to claim 14, further comprising:
not changing the characteristic amount when a difference between characteristic
amounts of the pair of blocks exceeds a predetermined upper threshold.

16. The image data processing method according to claim 13, further comprising:
changing at least one of the characteristic amounts of the pair of blocks so as to
arrange a difference between characteristic amounts of the pair of blocks to be equal to or
larger than a predetermined lower threshold when the magnitude relation coincides with a code
to be embedded and also when the difference is less than a lower threshold.

17. An image data processing method comprising:
dividing image data into a plurality of blocks;
encoding a code using an error correction coding to generate an error-correction-
coding code;
extracting a characteristic amount from each of the blocks; and
embedding a plurality of error-correction-coding codes based on a magnitude
relation of the characteristic amounts between each pair of blocks in proximity to each other in
the plurality of blocks.

18. The image data processing method according to claim 13, further comprising:
extracting each characteristic amounts from a portion of each block.

19. The image data processing method according to claim 13, further comprising:
cutting out a yellow component from the blocks; and

embedding a plurality of codes based on a magnitude relation of the characteristic amounts with regard to the yellow color components between each pair of blocks in the blocks.

20. The image data processing method according to claim 13, further comprising:
giving a cut-out mark for cutting-out an image area in which the codes are embedded.

21. The image data processing method according to claim 13, wherein the characteristic amount is an average density.

22. The image data processing method according to claim 13, wherein the characteristic amount is granularity, chroma, density barycenter, or variance.

23. The image data processing method according to claim 13, wherein repeatedly embedding for a plurality of codes.

24. An image data decoding method for decoding codes in an image data comprising:
dividing image data into a plurality of blocks;
extracting a characteristic amount from each of the blocks; and
decoding a plurality of codes based on a magnitude relation of the characteristic amounts between each pair of blocks in proximity to each other in the plurality of blocks.

25. A computer-readable medium storing a program which, when executed by a computer, causes the computer to perform operations comprising:
dividing image data into a plurality of blocks;
extracting a characteristic amount from each of the blocks; and
embedding a plurality of based on a magnitude relation of the characteristic amounts between each pair of blocks in proximity to each other in the plurality of blocks.

26. The computer readable medium according to claim 25, further comprising:
changing at least one of the characteristic amounts of the pair of blocks so as to reverse the magnitude relation of the characteristic amounts between the pair of blocks when

the magnitude relation does not coincide with a code to be embedded.

27. The computer readable medium according to claim 26, further comprising:
not changing the characteristic amount when a difference between characteristic amounts of the pair of blocks exceeds a predetermined upper threshold.

28. The computer readable medium according to claim 25, further comprising:
changing at least one of the characteristic amounts of the pair of blocks so as to arrange a difference between characteristic amounts of the pair of blocks to be equal to or larger than a predetermined lower threshold when the magnitude relation coincides with a code to be embedded and also when the difference is less than a lower threshold.

29. A computer-readable medium storing a program which, when executed by a computer, causes the computer to perform operations comprising:
dividing image data into a plurality of blocks;
encoding a code using an error correction coding to generate an error-correction-coding code;
extracting a characteristic amount from each of the blocks; and
embedding a plurality of error-correction-coding codes based on a magnitude relation of the characteristic amounts between each pair of blocks in proximity to each other in the plurality of blocks.

30. The computer readable medium according to claim 25, further comprising:
extracting each characteristic amounts from a portion of each block.

31. The computer readable medium according to claim 25, further comprising:
cutting out a yellow component from the blocks; and
embedding a plurality of codes based on a magnitude relation of the characteristic amounts with regard to the yellow color components between each pair of blocks in the blocks.

32. The computer readable medium according to claim 25, further comprising:
giving a cut-out mark for cutting-out an image area in which the codes are embedded.

33. The computer readable medium according to claim 25, wherein the characteristic amount is an average density.

34. The computer readable medium according to claim 25, wherein the characteristic amount is granularity, chroma, density barycenter, or variance.

35. The computer readable medium according to claim 25, wherein repeatedly embedding for a plurality of codes.

36. A computer readable medium storing a program which, when executed by a computer, causes the computer to perform decoding operations for decoding codes in an image data comprising:

dividing image data into a plurality of blocks;

extracting a characteristic amount from each of the blocks; and

decoding a plurality of codes based on a magnitude relation of the characteristic amounts between each pair of blocks in proximity to each other in the plurality of blocks.